Ethical Consideration

In the design of Science Gallery, a booking management system, we considered the following ethical issues:

1. **Privacy**
    a. Privacy data collection:
    Issue： On the user's reservation page, some information is required, which includes email, name, etc. The collection of users' personal information may raise privacy concerns.
    Solution： Ensure only necessary information is collected and obtain the user's explicit consent before collection. Add text to the booking page to explain why this information needs to be collected.
    b. Data storage and processing:
    Issue: There may be security breaches in data storage and processing that could result in user information being accessed or compromised by unauthorized persons. Since our bookings are for schools, underage data is very sensitive and therefore needs to be strictly protected.
    Solution: The booking management system implements strict access control measures so that only accounts registered in the database can log in, and operations can be performed after logging in.
    c. Sharing information:
    Issue: Since a Science Gallery booking involves a lot of people, such as booking transportation, booking a teacher for navigation, and so on. So some of the information may be shared with external people. The process of sharing may lead to some information leakage.
    Solution: Minimize the content of information to be shared. For example, when arranging a guided tour for a teacher, only program information and times are provided. Before sharing user information, the purpose and recipient of the sharing needs to be made clear to the user making the booking, and explicit consent needs to be obtained from the user. Anonymize the user's personally identifiable information before sharing the data to protect the user's privacy.
    d. Data transmission:
    Issue: When a user makes a booking using the web page, the submitted form is uploaded to the database. There may be a risk of leakage during the upload process.
    Solution: It is planned to use encryption protocols to ensure the security of data submitted by users on the web page during transmission.

2. **Transparency**
    a. Clarify the purpose of data collection:
    Provide a clear privacy policy and user agreement on the booking screen so that users can look up and understand how their data will be handled after submission.
    b. Ensure user awareness:
    Add a feature to the booking screen that requires users to agree to a privacy policy and user agreement to ensure they understand and agree to how data is processed.
    c. Provide instructions for using the booking management dashboard:
    Delivery is accompanied by instructions for use so that staff understand how the system collects, uses and shares booking data. Ensure staff understand the importance of data protection to prevent data breaches.
    d. Monitoring and recording:
    Record data export operations, each export needs to be supervised. Ensure that the use of data is legitimate and transparent and that potential misuse is detected promptly.

3. **Honesty**
    a. Data validation:
    When making a booking, the user may submit invalid information or incorrect information.
    For key information (e.g., booking times, contact information, etc.), logical validation is performed to ensure reasonableness and

accuracy. For example mailboxes only common mailbox endings are recognized as reasonable. Time can only be selected in a fixed format.

b. Data Auditing:
In the reservation management system, the staff on the booking page reviews and confirms the data and only the reviewed data generates a valid booking.

c. Authentication:
The booking management system can only be accessed by employees who have a specific account and password.

4. **Inclusivity**

a. Training & Support:
Provide multilingual technical support and help documentation to ensure that staff can understand and solve problems when using the booking management system.

b. Feedback:
Provide a feedback channel for users, and regularly ask for solutions to difficulties in use.

c. Multi-language support:

d. Provide multi-language interface options so that users can choose the language they are familiar with to operate the site. If the user provides another language at the time of booking, the information will still be accepted and processed by staff.

e. User-friendly pages:
Provide user-friendly pages that take into account various user needs. For example, pages can be adapted to various sizes, can be enlarged, etc.

5. **Sustainability**

a. Environmental impacts:
Issue: The operation of the servers may generate large amounts of carbon emissions, which can harm the environment.
Solution: Reduce carbon emissions and environmental impact by deploying servers in green data centres powered by renewable or efficient energy sources.

b. Resource utilization:
Issue: The development and maintenance of a reservation management system may require significant computing and human resources, affecting the efficient utilization of resources. For example, the science gallery needs to store and back up all the booking information will take up a lot of storage resources.
Solution: Optimize code and database queries to reduce server response time and resource consumption. Clean up duplicate and redundant data such as duplicate bookings and invalid booking information.